4.0 DESCRIPTION OF AFFECTED ENVIRONMENT (2005 SAFE REPORT)

The environment affected by the sea scallop fishery as a whole is described in section 7 of Amendment 10 to the Sea Scallop FMP (NEFMC 2003). That description is incorporated herein by reference. This section serves as the 2005 SAFE Report, which updates the data and analysis of the fishery through the 2004 fishing year, including the update assessment of the scallop resource, new estimates on safety trends, new analyses of limited access scallop effort distribution, and new estimates of finfish bycatch in both the controlled access and open areas. The 2005 SAFE Report also includes several relevant appendices (*Appendix I: Economic and Social Trends in the Sea Scallop Fishery, Appendix II: Methods Used for Sea Scallop Biological Projections, Appendix III: Total Bycatch Estimate of Loggerhead Turtles in the 2004 Atlantic Sea Scallop Dredge Fishery, Appendix IV: Summary of 2005 Sea Safety Information for the First Coast Guard District, and Appendix V: Methods and Detailed Analysis of Finfish Bycatch in the Scallop Access Programs*).

4.1 The Atlantic Sea Scallop Resource

The biological environment potentially affected by this action includes fishery resources. This section will focus on those fishery resources for which data are readily available, namely those targeted by commercial fisheries.

The management unit for the Scallop FMP consists of the sea scallop resource throughout its range in waters under the jurisdiction of the U.S. The five resource areas generally recognized within the management unit are: (1) Delmarva; (2) New York Bight; (3) South Channel and southeast part of Georges Bank; (4) Northeast peak and the northern part of Georges Bank; and (5) the Gulf of Maine. The Delmarva area includes scallops as far south as North Carolina (NEFMC 2003).

The Atlantic sea scallop (Placopecten magellanicus (Gmelin)) is a bivalve mollusk distributed along the continental shelf, typically on sand and gravel bottoms, from North Carolina to the north coast of the Gulf of St. Lawrence (Packer et al. 1999). Large concentrations of sea scallops are found on Georges Bank and the mid-Atlantic shelf, while smaller concentrations are found along coastal Maine, in the Bay of Fundy (Digby grounds), in the Gulf of St. Lawrence, on St. Pierre Bank, and in Port au Port Bay, Newfoundland (NEFMC 2003).

Atlantic sea scallops generally inhabit depths of 18–110 m but are most abundant on the continental shelf between 20 and 50 m. On occasion, they have been found at depths up to 384 m (NEFMC 2003). In the mid-Atlantic, concentrations occur within a narrow depth ban from about the 40 to the 200 m isobath, throughout the Hudson Canyon Area, and around the perimeter of Georges Bank, including the Great South Channel (NEFMC 2001). In mid-Atlantic waters, most scallops are harvested at depths of 30–100 m (NMFS 2004c).

Sea scallop abundance and biomass in the mid-Atlantic are currently at record-high levels (NMFS 2004c). For closed areas in the mid-Atlantic, abundance and biomass indices showed notable increases after the closure. In areas of the mid-Atlantic open to fishing, the biomass and abundance have increased since 1999, largely due to good recruitment over the last several years. In addition, increased yield-per-recruit due to effort reduction measures has contributed to high landings. During 2003, sea scallops were not overfished, but overfishing was occurring (NMFS 2004c).

The Scallop PDT updated the assessment of the scallop stock, using 2004 survey data, 2004 commercial catches, and methods that were reviewed and approved by the 32nd Stock Assessment

Workshop. This assessment covered a period when the new regulations under Amendment 10 were only partially implemented and Framework Adjustment 16/39 was implemented in November 2004. The Scallop PDT Report is summarized in the paragraphs below, and the entire report is attached to this document, *Appendix VI: Updated Scallop Assessment.*

Based on the updated assessment, the Scallop PDT found that in 2004 overfishing was occurring, i.e. the fishing mortality rate (F=0.35) was above the maximum mortality threshold (F=0.24) and significantly above the target (F=0.20). According to the analysis, fishing mortality was expected to decline to the threshold in 2005 as Amendment 10 regulations became fully effective. Biomass in the 2005 survey was a little less than the 2004 survey and landings appear that they will be somewhat above the target. This suggests that fishing mortality could be again somewhat above the threshold in 2005 and overfishing will continue.

On the other hand, biomass in 2004 rose to a record, 54% above the 5.6 kg per survey tow target. This biomass increase has occurred in both the Mid-Atlantic and Georges Bank regions, and in both closed and open areas. In 2004, Mid-Atlantic declined by about 4% from 2003 while Georges Bank biomass increased by 34% largely from the above average 2000 year class in Closed Area II access area.

Despite the high fishing mortality, the resource remains in very good condition, with a greater share of the landings coming from older and larger scallops. Two very strong year classes are now protected by the Elephant Trunk Area (ETA) closure and higher sustainable yield is forecasted with a potential for a modest increase in total DAS use, particularly when the benefits of the ETA closure are realized in 2007. A gradual shift in open area effort toward the Georges Bank region is forecasted from projected catch rates and could also help bring mortality down.

4.1.1 Biomass

Scallop biomass in the Georges Bank and Mid-Atlantic regions (which together account for 90-95% of scallop landings) has increased substantially from the depleted condition (< 1 kg/tow) that existed before 1998 and in 2004 was 54% above the target. Since 1997, scallop biomass increased first in the Georges Bank region (Figure 1) mostly as a result of the growth of scallops in the three groundfish closed areas. Biomass reached 8 kg/tow by 2000 and has since leveled off. Biomass peaked at 9.6 kg/tow in 2004 and declined to 7.6 kg/tow in 2005.

Increases of biomass in the Mid-Atlantic region began in 1999 and 2000 (Figure 1), resulting from a strong 1997 year class which was partially protected by the 1998-2000 HCA closure. Although the Hudson Canyon Area (HCA) reopened as a controlled access area in 2001, Mid-Atlantic biomass has continued increasing as a result of above average recruitment coupled with better size selection by the fishery and gear. Two year classes (2002-2003) are partially protected by the ETA closure, which will continue to add to stock biomass through 2007. Another above average year class has appeared in the 2005 survey south of the ETA and may benefit from a scallop closure.

Overall biomass has increased almost without interruption since 1997. Overall biomass was 8.2 kg/tow, 54% above the target. Biomass in 2005 declined by 5% to 7.8 kg/tow, which is probably not statistically significant.

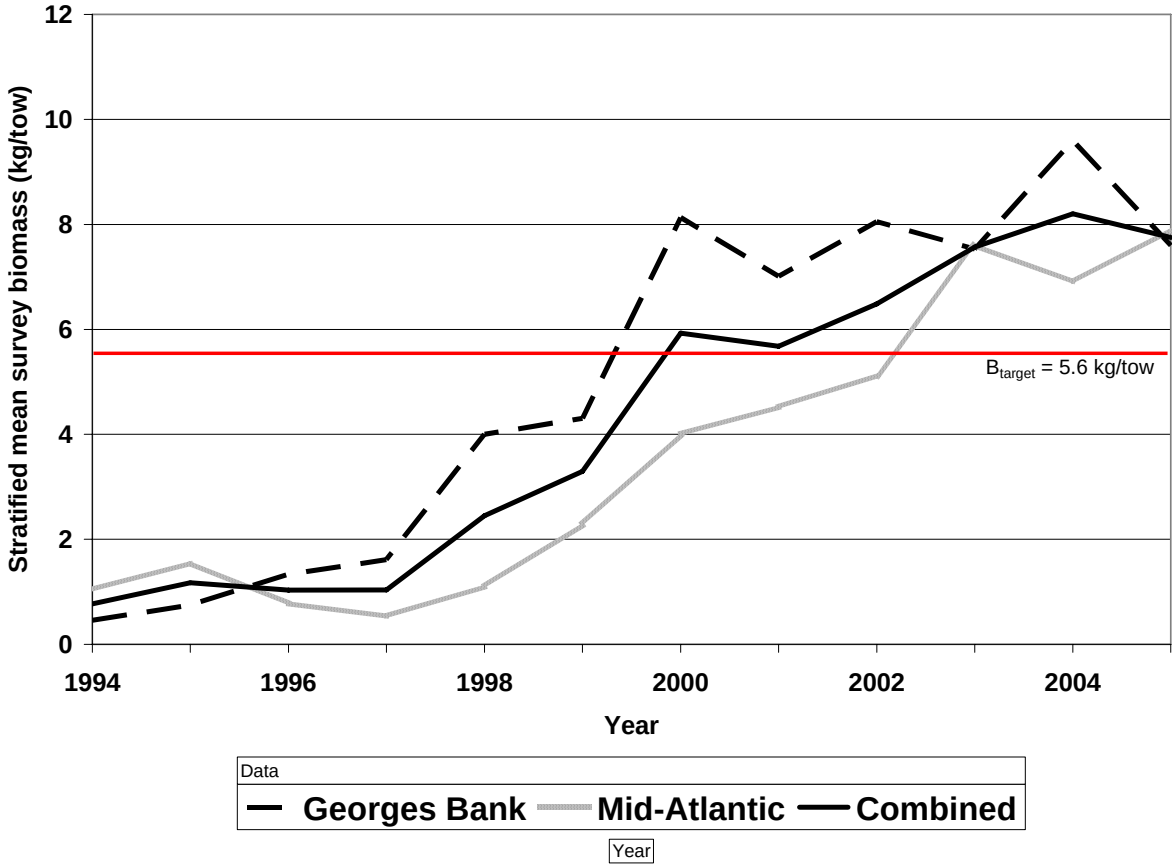


Figure 1. Trend in R/V Albatross stratified mean weight per tow, 1994-2005 (preliminary), by region. B_{target} is identified by the FMP as B_{MSY} and is calculated as the biomass that would result from average scallop recruitment and fishing at F_{max}

4.1.2 Fishing mortality

Trends in fishing mortality show a similar patter as DAS use (Figure 2), but has not increased to the same degree as DAS use in recent years, because of the effects of crew size, gear restrictions, and area rotation. Fishing mortality declined from high levels near 1.0 (60% annual exploitation) before 1994 to near the maximum threshold (F=0.24) in 1998-2000. Since then, fishing mortality has gradually increased to 0.35 in 2004 (Figure 3).

Georges Bank fishing mortality has been well below the threshold and target since 1998, partly from the effect of the groundfish closed areas but also due to the high scallop productivity in the Mid-Atlantic causing catch rates there to be higher, attracting 70-80% of total fishing effort. Mortality in the Mid-Atlantic region, has for the same reasons, remained stubbornly high, fluctuating between 0.4 and 0.6 from 1999-2003 (Figure 3). In 2004, fishing mortality increased to 0.67. The Scallop PDT attributed this increase to a number of factors, including management effects which caused the fishery to use more effort in the spring before Amendment 10 regulations took hold.

Although Amendment 10 and Framework 16/39 were intended to bring fishing mortality down to the target (F=0.32), early indications suggest that fishing mortality in 2005 will likely be above the

threshold, but not as high as they were in 2004. Landings appear that they will exceed the 54 million pounds target and biomass declined by 5%, suggesting that mortality will be a bit higher than previously forecast.

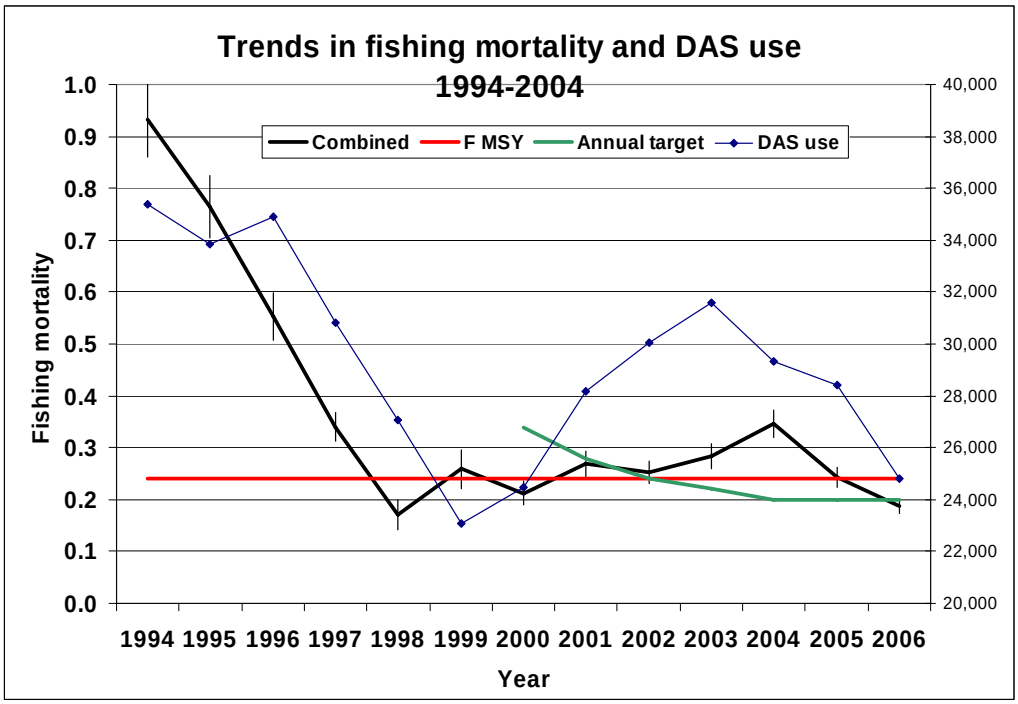


Figure 2. Estimated and projected trends in DAS use and fishing mortality.

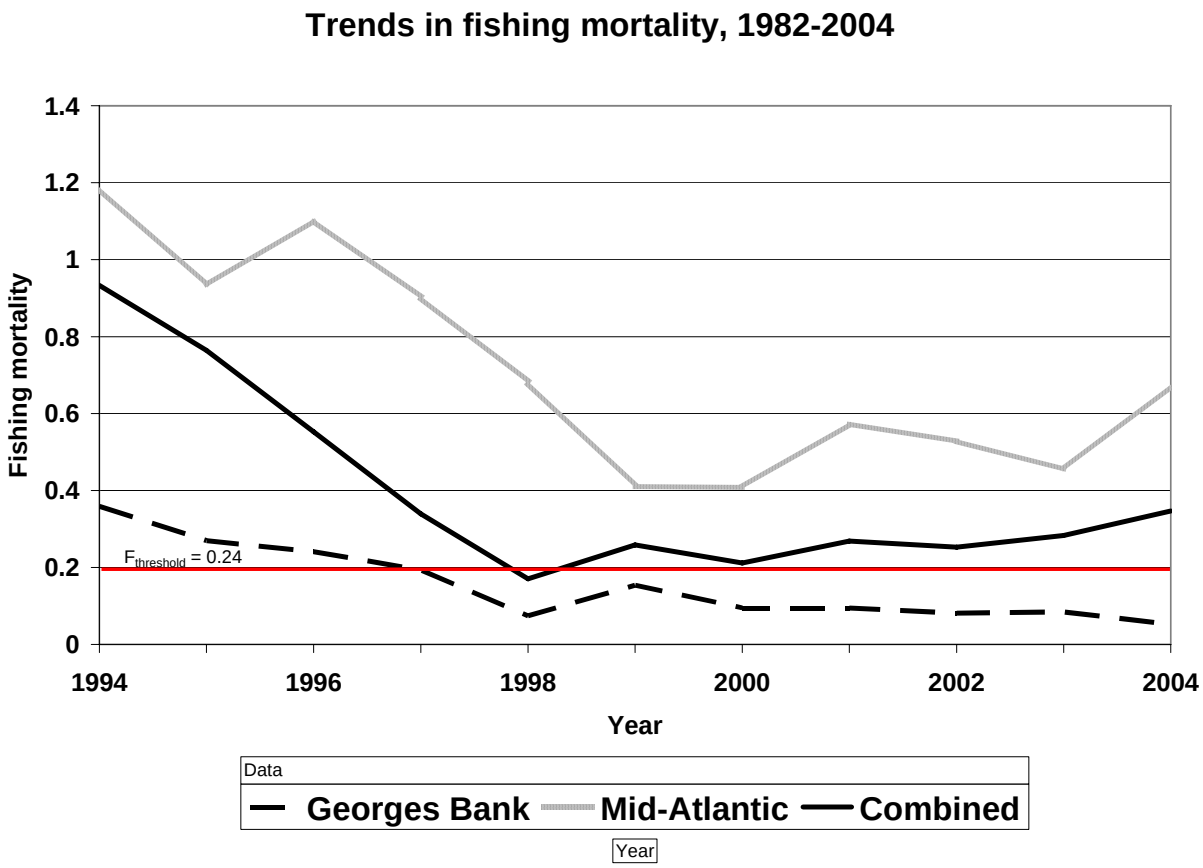


Figure 3. Trend in fishing mortality, 1994-2004, by region. $F_{threshold}$ is identified as F_{max}, a fishing mortality rate that maximizes yield-per-recruit.

4.2 Non-target Species

Non-target species, or bycatch include species caught by scallop gear that are not landed, including small scallops. The impacts of the scallops fishery on bycatch has been minimized to the extent practicable. Amendment 10 analyzed the impacts of new management measures (ring size, larger twine top, open area DAS, etc.) on bycatch, relying mainly on recent gear surveys and the general relationship between total area swept and bycatch. In general, the larger twine top mesh allowed greater escapement of many but not all finfish species with minor losses of sea scallops (particularly in areas having larger scallops). The effects of the increase to a 4" minimum ring size were assessed for various species observed in field trials, but the major effect came from a greater efficiency in catching scallops over 110-120 mm. Efficiency was forecast to increase by about 10-15%, reducing area swept by the same amount. Since most species were caught incidentally less frequently in dredges with larger rings and efficiency improved in most areas, Amendment 10 estimated that bycatch would decline, particularly in areas having most scallops larger than 110-120 mm. The increase to a minimum 4" ring in all areas did not occur until December 2004, however. Amendment 10 also estimated that the reductions in open area DAS would also reduce total area swept and increase scallop LPUE, particularly of larger scallops in the long-term.

Appendix IX of Amendment 10 details scallop and finfish bycatch estimates in the scallop fishery (http://www.nefmc.org/scallops/index.html).

Framework 16/39 estimated the total bycatch of many finfish species from observed trips taken in controlled access areas. It also estimated the amount of sampling needed in each area to estimate the total bycatch of a given species with various levels of precision. In general, rotational area management is designed to improve and maintain high scallop yield, while minimize impacts on groundfish mortality and other finfish catches. Access programs may even reduce fishing mortality for some finfish species, because the total amount of fishing time in the access areas is very low compared with fishing time in open areas. See Sections 6.1.1.2 and 6.1.1.3 of Framework 16/39 for more information about the expected impacts on bycatch from that action. Catches of regulated species in the access areas were expected to be less than 10% of the overall TAC in the Multispecies FMP. This amount is less than a level that the Groundfish PDT identified as having a possible repercussion for meeting the groundfish mortality targets and having an effect on rebuilding overfished groundfish stocks. Many of the impacts are expected to be similar for Framework 18 since this action proposes specifications for rotational area management in similar areas for fishing years 2006 and 2007.

Groundfish Mortality Closed Areas

The groundfish closed areas were originally established to reduce the effects of fishing on spawning cod and haddock, in particular Closed Areas I and II. Peak spawning activity occurs in February to April, coinciding with the original seasonal closures. After spawning, these fish often disperse to other areas during their annual migration. Yellowtail flounder is another species that was intended to be protected by the groundfish closed areas. The Georges Bank stock is predominately found on the southeastern and northwestern portions of Georges Bank, overlapping the proposed access areas in Closed Areas I and II. Unlike spawning cod and haddock, however, yellowtail flounder tend to remain in these locations year around. The Southern New England stock of yellowtail flounder was one of the primary intended beneficiaries of the Nantucket Lightship Area. Most of this stock occurs in the portions of the Nantucket Lightship Area that will remain closed to scallop fishing, or in other areas of Southern New England and the Mid-Atlantic region where scallop fishing occurs in open areas. More details about the biological characteristics of groundfish species in the closed areas is provided in the FSEIS for Amendment 13 to the Multispecies FMP.

The biological characteristics of other species found in the groundfish closed areas and the proposed access areas can be found in the Skate FMP and Monkfish FMP EIS documents. In general, several skate species are often found in the proposed access areas. The Skate FMP identified the conservation associated with the groundfish closed areas to be an important component of limiting mortality on skates, which is a major reason why a skate baseline review was initiated for this framework adjustment (Section 6.1.3.1). Although monkfish inhabit and are caught in the groundfish closed areas, the center of the monkfish distribution is in the Gulf of Maine to the north, and in deeper waters off Southern New England to the west.

New Information

Appendix V of this document summarizes the spatial and temporal distribution of observed hauls and also summarizes the mean catch rates (lbs/hr) of commonly observed species in scallop dredge incidental catches. Recently, NMFS has increased sea sampling on trips made by scallop vessels using dredges. Since 1999, sea sampling in access areas had been enhanced by an industry-funded TAC set-aside program. During this time, 584 scallop trips and 31,230 tows had been observed (see Appendix V). The data from this program was very useful to estimate total bycatch in access areas. NMFS also increased sampling on open area trips, particularly in the Mid-Atlantic, in response to new observations of interactions with sea turtles in the Hudson Canyon Area (on access area trips using observers funded by the TAC set-aside). Sampling increased from 26 trips and 1,348 tows in 2002 to 77 trips and 4,896 tows

in 2003, enabling NMFS to estimate the total incidental captures of sea turtles during 2003. Sampling again increased to 173 trips and 8,100 tows in 2004, almost and eight-fold increase from the sampling level during 1992 to 2002.

Section 5.1.2 of this document assesses the impacts of the alternatives under consideration on non-target species. In general, all the measures included in the proposed action have positive or neutral cumulative impacts on non-target species.

4.3 Threatened, Endangered and Other Protected Species

A complete list of threatened, endangered and other protected species inhabiting the scallop management unit was provided in Amendment 10 to the Sea Scallop FMP and is attached to this document as Attachment B (See Amendment 10 to the Atlantic Sea Scallop Fishery Management Plan, Section 7.2.7, Protected Species for a complete list. An electronic version of the document is available at http://www.nefmc.org/scallops/index.html.. An update and summary is provided here to facilitate consideration of the species most likely to interact with the scallop fishery relative to the proposed action.

According to the most recent Biological Opinion provided by NOAA Fisheries and dated 12/15/04, the scallop management program as currently implemented may adversely affect loggerhead and leatherback sea turtles. Loggerheads were previously considered the only hard-shelled turtle species that has been identified as captured in the scallop dredge fishery despite increased observer coverage throughout the fishery and improved observer training to identify and document sea turtle interactions with the fishery.

On November 1, 2005, however, the agency reinitiated Section 7 consultation under the Endangered Species Act based on new information regarding takes of sea turtles in the trawl component of the scallop fishery, new information regarding the species observed captured in scallop fishing gear and the location the observed takes. The factors discussed are now incorporated into considerations of protected species in Framework 18.

A turtle observed captured in scallop dredge gear operating on Georges Bank in August 2005 was identified as a Kemp's ridley from photographs taken by an NMFS-authorized observer. The event constitutes new information about the area in which interactions between sea turtles and scallop fishing gear occurs and the species involved in such interactions.

Moreover, a review of past observer records also revealed new information on the fishery in relation to its effects on ESA-listed sea turtles. Following a review of information associated with a turtle observed taken in scallop dredge gear in 1997, it was determined that the turtle was a green sea turtle as originally identified by the observer and as recorded in the observer database. Previous agency Biological Opinions for the Atlantic sea scallop fishery, including the December 15, 2004, Opinion had identified this turtle as an "unidentified hard-shelled species' dating back to the December 28, 2000 ESA section 7 consultation for Framework Adjustment 14 to the Atlantic Sea Scallop FMP.

And finally, a total of five loggerhead sea turtles have been observed captured in trawl gear used in the Atlantic sea scallop fishery during the 2005 fishing year to date. Therefore, the number of loggerhead sea turtles observed taken thus far in the 2005 scallop trawl fishery represents new information on the effects of the fishery on ESA-listed sea turtles. Previously, interactions were not attributed to the sector of the fishery.

The agency retains the finding that hawksbill sea turtles are not likely to be affected by the sea scallop fishery or associated management actions. The agency also previously determined and maintains that the scallop management program is not likely to adversely affect shortnose sturgeon, the Gulf of Maine distinct population segment (DPS) of Atlantic salmon, North Atlantic right whales, humpback whales, fin whales, sei whales, blue whales, or sperm whales, all of which are listed as endangered species under the ESA.

A number of cetacean and pinniped species inhabit the action area and are not listed under the ESA, but are afforded protection by the Marine Mammal Protection Act. Several are vulnerable to scallop dredge gear. Although documented reports of such interactions have been non-existent for numbers of years, recent information obtained through the NMFS observer program has documented a harbor porpoise, and unidentified dolphin and an unknown species of seal taken in scallop dredge gear. Species of marine mammals likely to be found in the scallop management unit are listed in Amendment 10 to the Scallop FMP (See Amendment 10 to the Atlantic Sea Scallop Fishery Management Plan, Section 7.2.7, Protected Species for a complete list. An electronic version of the document is available at http://www.nefmc.org/scallops/index.html. No evidence to date indicates the current scallop management program adversely affects right whale critical habitat.

4.3.1 Sea Turtle Interactions

The following protected species sections, including tables and maps, were taken from or summarized from Murray 2004, Murray 2004a, and Murray 2005 and are included to inform the discussion in Section 5.0, Environmental Consequences. Observations of the fishery to date have documented sea turtle interactions with the scallop dredge fishery in the Mid-Atlantic during the months of June through October and potentially in May and November.

History of Observer Coverage from 2001-2004

Since a dedicated observer program began monitoring fishing effort in the Atlantic sea scallop dredge fishery in 2001, turtle interactions with dredge gear have occurred throughout various areas of the Mid-Atlantic Bight. During 2001-2002, observer coverage (% observed dredge hours/VTR dredge hours) was focused almost entirely in the Hudson Canyon and Virginia Beach Access Areas (Table 31). During these two years, observers sampled approximately 11% of the commercial dredge effort in the Hudson Canyon Access Area from May to December. Less than 16% of the effort was observed in the Virginia Beach Access Area during 2001. No trips were observed in the Virginia Beach Access Area during 2002 due to low commercial fishing effort in the area. Outside of these two areas, observer coverage was less than 1%.

The spatial extent of observer coverage in the commercial scallop dredge fishery expanded in 2003 and 2004. This increase in spatial coverage was needed to properly assess bycatch outside of the access areas. During 2003, observers sampled approximately 10% of the dredge effort in the Hudson Canyon Access Area from June to November, and approximately 1.5% in open areas of the Mid-Atlantic outside of the Hudson Canyon between Montauk, NY and Cape Hatteras, NC. During June-November 2004, observer coverage in the Hudson Canyon Access Area was 6%, and 4% in open areas of the Mid-Atlantic.

Prior to the availability of the most recent information it has been assumed that there were few turtle interactions in the scallop fishery in the Georges Bank and Gulf of Maine regions during 2001-2004 (Murray 2005). This is largely because the scallop fisheries there operate north of the general range of loggerhead turtles (~41°N as a northern limit; Shoop and Kenney 1992). Moreover, there were no observed takes in the sea scallop dredge fishery operating on Georges Bank during 2001-2004, although observer coverage in the region was limited. Observer coverage increased during 2004, but most of the

coverage occurred in November after Closed Area II and Nantucket Lightship Access Areas opened and when interactions would not be likely based on sea turtle temperature preferences (Epperly et al. 1995b; Shoop and Kenney, 1992).

From 2001-2003 there was insufficient observer coverage in the scallop trawl fishery to support a scientifically defensible estimate of sea turtle bycatch in this fishery (Murray 2004a). A potential for turtle bycatch exists, however, as evidenced by the information discussed earlier and obtained from observations of scallop trawl trips in 2004 and 2005, as well as the spatial and temporal overlap of scallop trawl fishing effort overlaps and sea turtle distribution.

Table 31. Seasonal Observer Coverage in the Atlantic Sea Scallop Dredge Fishery 2001-2004*

Region	2001	2002	2003	2004
Hudson Canyon	10.6%	11.4%	9.7%	6.0%
Virginia Beach	15.6%	0%	0%	0%
Mid-Atlantic Open Areas	<1%	<1%	1.4%	4.0%
Georges Bank	<1%	<1%	<1%	<2%

*Coverage in 2001-2002 was calculated from May to December, and in 2003-2004 from June to November

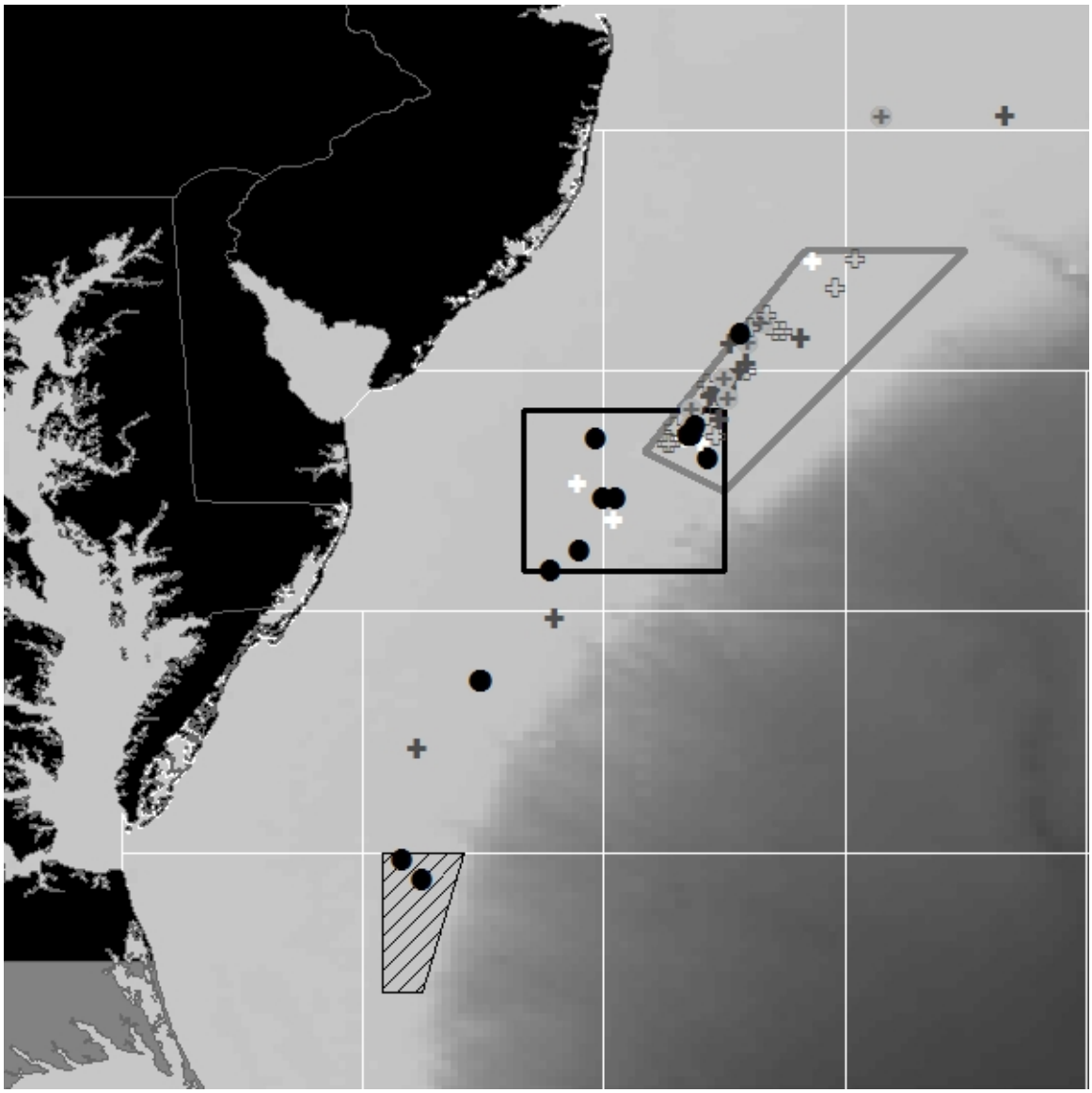
Observed Turtle Interactions from 2001-2004

From 2001-2004, turtle interactions in the sea scallop dredge fishery were observed to occur from June to October, with the maximum number of observed takes per month varying from year to year (Table 32). Most of the observed interactions occurred between 37°N to 40°N latitudes, in depths between 50-70 m (Map 7) in the Hudson Canyon Access Area, the Virginia Beach Access Area, the Elephant Trunk Access Area, and open areas of the Mid-Atlantic (Table 3). It is important to note that greatest percentage of the observed trips were taken in the Hudson Canyon Area, potentially biasing information on the latitude and depth in which interactions occur. Since 2001, only loggerhead turtles (*Caretta caretta*) have been positively identified in the scallop dredge fishery in the Mid-Atlantic.

Table 32. Observed Turtle Interactions by Month and Year in the Atlantic Sea Scallop Dredge Fishery 2001-2004

	2001*	**2002***	**2003**	**2004**	**Total**
June	3	0	0	2	5
July	4	8	4	0	16
August	1	3	6	3	13
September	0	6	2	1	9
October	3	0	10	2	15
Total	11	17	22	8	58

Map 7 **Turtle Bycatch in the Atlantic Sea Scallop Dredge Fishery 2001-2004 (Observer Database).**



Map Legend:
Month classification (June=white solid cross, July=gray outlined cross, August=gray solid cross, September=dark gray cross in light gray circle, October=black circle).
Areas (Hudson Canyon Area is polygon in the North, Elephant Trunk area is the rectangle in the middle, and Virginia Beach area is the polygon in the south).

Table 33. Observed Turtle Interactions by Month, Year, and Mid-Atlantic Region in the Atlantic Sea Scallop Dredge Fishery 2001-2004

Year	Region	Month				
		Jun	Jul	Aug	Sep	Oct
2001	Open+	NA				
	HCAA	3	4	1	0	1
	ETA	NA				
	VB	0	0	0	0	2
2002	Open	NA				
	HCAA	0	8	3	6	0
	ETA	NA				
	VB	NA				
2003	Open	0	0	0	0	0
	HCAA	0	4	5	2	5*
	ETA	0	0	1	0	5
	VB	NA				
2004	Open	0	0	2	1	2
	HCAA	0	0	1	0	0
	ETA	2	0	0	0	0
	VB	NA				

NA= Insufficient observer coverage existed in that block
+=Mid Atlantic excluding HCAA, ETA, and VB
* 4 of the 5 takes in the HCAA occurred in the area overlapping the ETA

Total Estimated Bycatch of Turtles from 2001-2004

During 2001-2002, total estimated bycatch of sea turtles in the Hudson Canyon and Virginia Beach Access Areas was 169 animals (CV =55.3), of which 164 (97%) animals were in the Hudson Canyon area (Murray 2004). Estimation of bycatch for all of the Mid-Atlantic Bight was possible after observer coverage expanded outside of the Access Areas in 2003-2004. The 2003 estimate was 749 animals (CV =0.28) (Murray 2004a), of which 122 (16%) were in the Hudson Canyon Access Area. In 2004, total estimated bycatch of turtles was 180 animals (CV =0.37), of which 17 (9%) were in the Hudson Canyon Access Area (Murray 2005).

Summary of 2004 Turtle Interactions in the Scallop Dredge Fishery

During 2004, factors influencing the bycatch rates of loggerhead turtles were depth zone, and geographic area. Areas of highest predicted bycatch rates were located to the north and south of the Hudson Canyon Access Area in water depths of 54-70m (Map 8). During 2003, almost all of the turtle interactions in the Elephant Trunk Area occurred during October (Table 33).

The total estimated bycatch of loggerhead sea turtles from 1 June to 30 November 2004 in the Mid-Atlantic sea scallop dredge fishery was 180 animals (CV=0.37, 95% CI=65-319). Of these 180 takes, 17 occurred in the Hudson Canyon Access Area (HCAA) and 163 occurred outside this area.

Eight turtle interactions were observed in the Mid-Atlantic sea scallop dredge fishery during 2004. Two of the 8 takes occurred in June (25%), 3 in August (38%), 1 in September (12%), and 2 in October (25%). Two of the 8 (25%) turtles were released alive and uninjured, 5 were injured (63%), and 1 (12%) was fresh dead. Only 1 of the eight takes (12%) occurred in the HCAA.

It was previously assumed that there are no turtle interactions in the sea scallop fishery in the Georges Bank and Gulf of Maine regions in 2004, because fisheries there operate north of the general range of loggerhead turtles, and no observed takes occurred during 2002-2004 in these regions. Updated information discussed earlier indicates a that a turtle taken on Georges Bank in 1997 was a green and that a Kemp's ridley was taken in 2005 on Georges Bank in scallop dredge gear.

A total of 172 trips were observed during June-November 2004 in the Mid-Atlantic scallop dredge fishery, of which 16 trips were aboard vessels whose dredges were equipped with turtle chain mats (and in which no turtle takes occurred). From June-November 2004, observers sampled 5% (% observed dredge hours/VTR dredge hours) of the commercial sea scallop dredge fishing effort in the Mid-Atlantic. Observer coverage in the HCAA was 6%, and 4% outside the area.

Factors related to the bycatch rates of turtles in 2004 were depth zone, and whether trips occurred inside or outside of the HCAA. Highest bycatch rates occurred outside of the HCAA, in depths between 54 and 70m.

By contrast, during 2003, an estimated 749 loggerhead turtle interactions occurred. Of these 749 takes, 122 occurred in the HCAA and 627 occurred outside this area. Again the caveat applies that most of the observed trips occurred in the Hudson Canyon Area

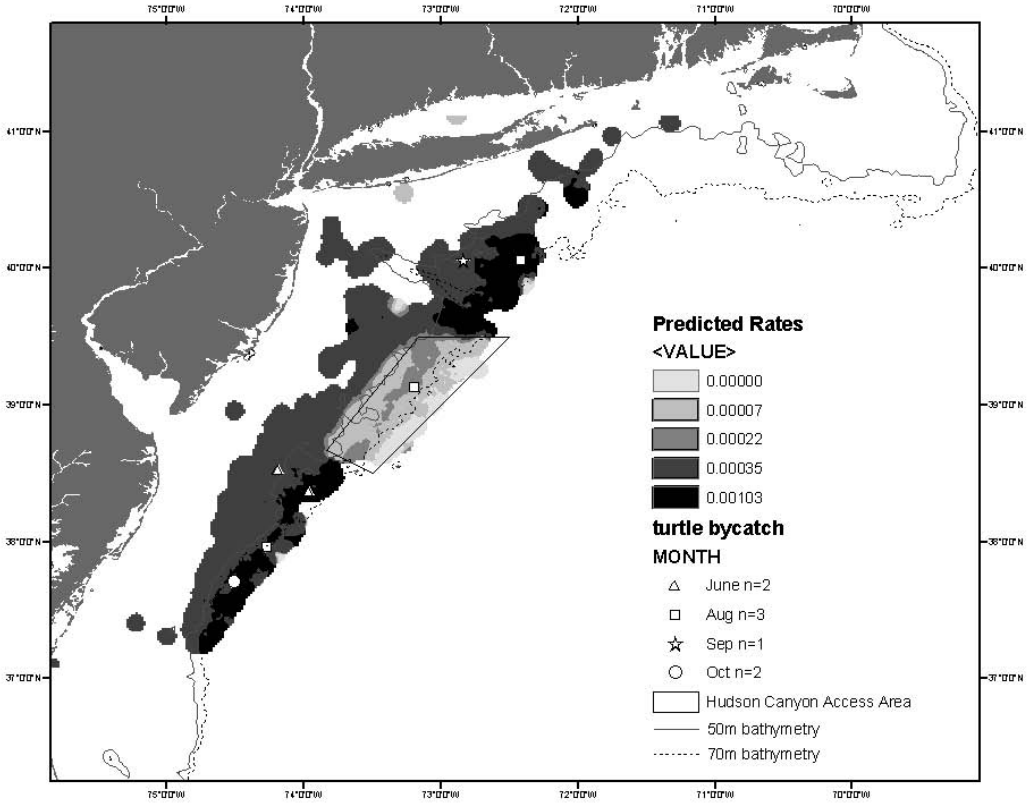
Several changes occurred in the sea scallop dredge fishery during 2004, which may have impacted the probability of encountering a turtle in scallop dredge gear. These include voluntary use by some fishermen of the chain mat gear, as well as rotational and gear restrictions which shifted the distribution of fishing effort.

Only 1 turtle take was observed in the HCAA during 2004 compared to 16 takes in 2003, despite an 18% increase in 2004 in observer effort (dredge hours observed) in the HCAA. Outside the HCAA, 7 turtle takes were observed in 2004 compared to 6 takes in 2003, but observer effort in 2004 was 2.3X greater than in 2003. Reductions in the HCAA bycatch rate may have been due to scallop dredge fishing effort shifting into deeper waters (≥ 70 m) in 2004, as well as changes in sea surface temperature in this region during the season of turtle bycatch.

Estimated sea turtle takes were lower in 2004 than in 2003 (180 vs. 749). Compared to 2003, estimated takes in 2004 were lower both inside the HCAA (17 in 2004 vs. 122 in 2003) and outside of the HCAA (163 in 2004 vs. 627 in 2003).

During 2004, sixteen trips were observed on vessels equipped with chain mats. None of these trips caught turtles. In the 2004 bycatch assessment, there was no difference in the bycatch rate between vessels that used a chain mat and those that did not; however, there may have been too few trips observed to detect any significant effects of the chain mat (Murray 2005). Industry trials revealed that the chain mat could successfully exclude turtles from entering the dredge bag (DuPaul and Smolowitz 2004). Use of turtle chain mats is currently proposed to be mandatory for sea scallop dredge vessels operating in the Mid-Atlantic from May through November. This measure may help reduce the bycatch of turtles in the future (Proposed Rule, FR 70: 30660-30666, 27 May 2005.)

Map 8 Predicted bycatch rates of turtles in the Mid-Atlantic sea scallop dredge fishery, June to November 2004 (Murray 2005).



4.4 Physical Environment and Essential Fish Habitat

EFH descriptions and maps for Northeast region species can be accessed at http://www.nero.nmfs.gov/ro/doc/hcd/. The following description and map of EFH for Atlantic sea scallops *(Placopecten magellanicus*) is excerpted from the Omnibus EFH Amendment. Essential fish habitat for Atlantic sea scallops is described as those areas of the coastal and offshore waters (out to the offshore U.S. boundary of the exclusive economic zone) that are designated on Map 32 in Amendment 10 to the Atlantic sea scallop FMP and meet the following conditions:

Eggs: Bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to the Virginia -North Carolina border as depicted in Map 32. Eggs are heavier than seawater and remain on the seafloor until they develop into the first free-swimming larval stage. Generally, sea scallop eggs are thought to occur where water temperatures are below 17°_C. Spawning occurs from May through October, with peaks in May and June in the middle Atlantic area and in September and October on Georges Bank and in the Gulf of Maine.

Larvae: Pelagic waters and bottom habitats with a substrate of gravelly sand, shell fragments, and pebbles, or on various red algae, hydroids, amphipod tubes and bryozoans in the Gulf of Maine, Georges

Bank, southern New England and the middle Atlantic south to the Virginia -North Carolina border as depicted in Map 32. Generally, the following conditions exist where sea scallop larvae are found: sea surface temperatures below 18°_C and salinities between 16.9‰ and 30‰.

Juveniles: Bottom habitats with a substrate of cobble, shells and silt in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to the Virginia -North Carolina border that support the highest densities of sea scallops as depicted in Map 32. Generally, the following conditions exist where most sea scallop juveniles are found: water temperatures below 15°_C, and water depths from 18 - 110 meters.

Adults: Bottom habitats with a substrate of cobble, shells, coarse/gravelly sand, and sand in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to the Virginia –North Carolina border that support the highest densities of sea scallops as depicted in Map 32. Generally, the following conditions exist where most sea scallop adults are found: water temperatures below 21°_C, water depths from 18 - 110 meters, and salinities above 16.5‰.

Spawning Adults: Bottom habitats with a substrate of cobble, shells, coarse/gravelly sand, and sand in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to the Virginia - North Carolina border that support the highest densities of sea scallops as depicted in Map 32. Generally, the following conditions exist where spawning sea scallop adults are found: water temperatures below 16°_C, depths from 18 - 110 meters, and salinities above 16.5‰. Spawning occurs from May through October, with peaks in May and June in the middle Atlantic area and in September and October on Georges Bank and in the Gulf of Maine.

Section 7.2.5 of the FSEIS to Amendment 10 described benthic habitats that exist within the range of the scallop fishery biological characteristics of regional systems, and assemblages of fish and benthic organisms. It also included a description of canyon habitats on the edge of the continental shelf. No new information is available.

Section 7.2.6 of the FSEIS to Amendment 10 evaluated the potential adverse effects of gears used in the scallop fishery on EFH for scallop and other federally-managed species and the effects of fishing activities regulated under other federal FMPs on scallop EFH. The evaluation considered the effects of each activity on each type of habitat found within EFH. The two gears used in the directed scallop fishery are bottom trawls and scallop dredges. Scallop EFH has been determined to only be minimally vulnerable to bottom-tending mobile gear (bottom trawls and dredges) and bottom gillnets. Therefore, the effects of the scallop fishery and other fisheries on scallop EFH do not require any management action. However, the scallop dredge and trawl fisheries do have more than a minimal and temporary impact on EFH for a number of other demersal species in the region.

The following conclusions were reached in Amendment 10 to the Atlantic sea scallop FMP:

- Potentially adverse habitat impacts from bottom trawling occur throughout most of the NE region on a variety of substrates;

- High levels of fishing activity with scallop dredges occur primarily in the Mid-Atlantic region and secondarily on Georges Bank, according to the vessel trip report data from 1995 – 2001. Intense dredge activity from the same data show that the highest intensity of scallop fishing is in the Great South Channel and portions of the Mid-Atlantic region from Long Island to VA. The VMS data from 1998 confirms this assessment and also shows high scallop fishing intensity in the southern part of Closed Area II because the period included the area access

program during the 1999 and 2000 fishing years which was intended to have high levels of effort to reduce impacts in open areas where smaller scallops existed.

- Potentially adverse habitat impacts from scallop dredging may occur in areas where scallop effort overlaps with areas where EFH has been designated for species with vulnerable EFH. According to the analysis within this document, scallop fishing effort is distributed in the same proportion as juvenile and adult EFH designations, but areas with more intense scallop fishing effort tend to be over areas with less EFH designations for species with vulnerable EFH.

Adverse impacts that were more than minimal and less than temporary in nature were identified for the following species and life stages, based on an evaluation of species life history and habitat requirements and the spatial distributions and impacts of bottom otter trawls in the region (Stevenson *et al*., in press):

Otter Trawls
The use of Otter Trawls may have an adverse effect on the following species (and life stages) EFH as designated in Amendment 11 to the Northeast Multispecies FMP (1998):

> *American plaice (Juvenile (J), Adult (A)), Atlantic cod (J, A), Atlantic halibut (J, A), haddock (J, A), ocean pout (E, L, J, A), red hake (J, A), redfish (J, A), white hake (J), silver hake (J), winter flounder (A), witch flounder (J, A), yellowtail flounder (J, A), red crab (J, A), black sea bass (J, A), scup (J), tilefish (J, A), barndoor skate (J, A), clearnose skate (J, A), little skate (J, A), rosette skate (J, A), smooth skate (J, A), thorny skate (J, A), and winter skate (J, A).*

Scallop Dredge (New Bedford style)
The use of New Bedford style Scallop Dredges may have an adverse effect on the following species (and life stages) EFH as designated in Amendment 11 to the Northeast Multispecies FMP (1998):

> *American plaice (J, A), Atlantic cod (J, A), Atlantic halibut (J, A), haddock (J, A), ocean pout (E, L, J, A), red hake (J, A), redfish (J, A), white hake (J), silver hake (J), winter flounder (J, A), yellowtail flounder (J, A), black sea bass, (J, A), scup (J), barndoor skate (J, A), clearnose skate (J, A), little skate (J, A), rosette skate* (J, A), smooth skate (J, A), thorny skate (J, A), and winter skate (J, A).*

Gear types other than otter trawls and scallop dredges, in the context of the Atlantic Sea Scallop fishery, were not found to have adverse effects the Essential Fish Habitat as currently designated in this region. See Table 34 for a description of the species and life staged that were determined to be adversely impacted in a manner that is more than minimal and less than temporary in nature in Amendment 10.

Table 34. Summary species and life stage's EFH adversely impacted by otter trawling and scallop dredging (gears that adversely impact EFH used in the Scallop fishery).

Species	Life Stage	Vulnerability to Otter Trawling	Vulnerability to Scallop Dredging	Depth in meters (EFH Designation)	Substrate (EFH Designation)
American Plaice	A	High	High	45-150	sand or gravel
American Plaice	J	Mod	Mod	45-175	sand or gravel
Atlantic Cod	A	Mod	Mod	25-75	cobble or gravel
Atlantic Cod	J	High	High	10-150	rocks, pebble, gravel
Atlantic Halibut	A	Mod	Mod	20-60	sand, gravel, clay
Atlantic Halibut	J	Mod	Mod	100-700	sand, gravel, clay
Barndoor Skate	A	Mod	Mod	0-750, mostly <150	mud, gravel, and sand
Barndoor Skate	J	Mod	Mod	0-750, mostly <150	mud, gravel, and sand
Black Sea Bass	A	High	High	20-50	structures, sand and shell
Black Sea Bass	J	High	High	1-38	rough bottom, shell and eelgrass beds, structures and offshore clam beds in winter
Clearnose Skate	A	Mod	Mod	0-500, mostly <111	soft bottom along shelf and rocky or gravelly bottom
Clearnose Skate	J	Mod	Mod	0-500, mostly <111	soft bottom along shelf and rocky or gravelly bottom
Haddock	A	High	High	35-100	pebble gravel
Haddock	J	High	High	40-150	broken ground, pebbles, smooth hard sand, smooth areas between rocky patches
Little Skate	A	Mod	Mod	0-137, mostly 73-91	sand or gravel or mud
Little Skate	J	Mod	Mod	0-137, mostly 73-91	sand or gravel or mud
Ocean Pout	A	High	High	<110	soft sediments
Ocean Pout	J	High	High	<80	smooth bottom near rocks or algae
Ocean Pout	L	High	High	<50	close to hard bottom nesting areas
Ocean Pout	E	High	High	<50	hard bottom, sheltered holes
Pollock	A	Mod	Mod	15-365	hard bottom, artificial reefs
Red Hake	A	Mod	Mod	10-130	sand and mud
Red Hake	J	High	High	<100	shell and live scallops
Redfish	A	Mod	Mod	50-350	silt, mud, or hard bottom
Redfish	J	High	High	25-400	silt, mud, or hard bottom
Rosette Skate	A	Mod	Mod	33-530, mostly 74-274	soft substrates including sand/mud and mud
Rosette Skate	J	Mod	Mod	33-530, mostly 74-274	soft substrates including sand/mud and mud
Scup	J	Mod	Mod	0-38	inshore sand, mud, mussel and eelgrass beds
Silver Hake	J	Mod	Mod	20-270	all substrate types
Smooth Skate	A	High	High	31-874, mostly 110-457	soft mud, sand, broken shells, gravel and pebbles
Smooth Skate	J	Mod	Mod	31-874, mostly 110-457	soft mud, sand, broken shells, gravel and pebbles
Thorny Skate	A	Mod	Mod	18-2000, mostly 111-366	sand gravel, broken shell, pebble, and soft mud
Thorny Skate	J	Mod	Mod	18-2000, mostly	sand gravel, broken shell, pebble,

Species	Life Stage	Vulnerability to Otter Trawling	Vulnerability to Scallop Dredging	Depth in meters (EFH Designation)	Substrate (EFH Designation)
				111-366	and soft mud
Tilefish	A	High	Low	76-365	rough, sheltered bottom
Tilefish	J	High	Low	76-365	rough, sheltered bottom
White Hake	J	Mod	Mod	5-225	pelagic during pelagic stage and mud or fine sand during demersal stage
Winter Flounder	A	Mod	Mod	1-100	estuaries with mud, gravel, or sand
Winter Skate	A	Mod	Mod	0-371, mostly <111	sand, gravel, or mud
Winter Skate	J	Mod	Mod	0-371, mostly <111	sand, gravel, or mud
Witch Flounder	A	Mod	Low	25-300	fine-grained sediment
Witch Flounder	J	Mod	Low	50-450	fine-grained sediment
Yellowtail Flounder	A	Mod	Mod	20-50	sand and mud
Yellowtail Flounder	J	Mod	Mod	20-50	sand and mud

In Amendment 13 to the Northeast Multispecies FMP and Framework 16 to the Scallop FMP, the New England Council implemented a range of measures to minimize the impacts of bottom trawling in the Gulf of Maine, George's Bank and Southern New England. In addition to the significant reductions in days-at-sea and some gear modifications, the Council closed 2,811 square nautical miles to bottom-tending mobile fishing gear (known as Habitat Closed Areas). Although on August 2, 2005 the portions of Framework 16 that modify the habitat closures established by Amendment 10 were vacated by a court order; therefore, measures to minimize adverse effects of gear used in the scallop fishery that adversely affect EFH above the threshold allowed by law remain in effect due to the regulations promulgated as a result of Amendment 13 to the Northeast Multispecies FMP. It should be noted that the Amendment 13 and the Framework 16 habitat closure boundaries are exactly the same and are both Level 3 closures.

Because the monkfish fishery overlaps significantly with the groundfish fishery in the northern fishery management area and the habitat closed areas extend into the southern fishery management area, measures to protect habitat in Amendment 10 and Amendment 13 assist in minimizing the effect of fishing on EFH in the monkfish fishery.

4.5 Fishery Businesses and Communities

The sea scallop fishery has been previously described in various documents (SPDT 2000, NEFMC 2003, NMFS 2004c), and the following provides an updated description of the fishery. The historical trends in fishing activity (DAS), landings, revenues, prices and foreign trade in the sea scallop fishery is further discussed in SAFE 2005 report provided in the Appendix I.

4.5.1 Participation and permits in sea scallop fishery

The scallop fishery consists of vessels with limited access scallop permits that are regulated with area-specific DAS and trip allocations and vessels with general category scallop permits that are regulated with a 400 lb. possession limit. The limited access fishery was established since Amendment 4 to the Scallop FMP was developed and implemented in 1994 (NEFMC 2003). The limited access vessels consist of full-time, part-time and occasional vessels with subcategories within each permit group. Depending on the type of limited access permit for which the vessel qualified, a scallop limited access vessel may have the option of fishing with any gear type (permit categories 2, 3 and 4), with a small dredge (categories 5 and 6), or with trawl nets (categories 7, 8 and 9). Fishing effort for vessels that

possess limited access permits is managed through the use of crew size restrictions, gear restrictions, and DAS allocations. In terms of the latter, DAS allocations vary by which limited access permit is possessed by the vessel (Table 36).

Days-at-Sea and trip allocations for special access areas are similarly varied by permit category. Owners of limited access vessels assigned to either the part-time or occasional categories (permit categories 3 and 4, respectively) may opt to be placed one category higher (permit categories 5 and 6, respectively), provided they agree to comply with the small dredge program restrictions. Vessels in the small dredge program must: (1) fish exclusively with one dredge no more than 10.5 ft in width; (2) the vessel may not have more than one dredge on board or in use; and (3) the vessel may have no more than five people, including the operator, on board (NEFMC 2003).

The number of limited access vessels increased from 280 in 1999 to 337 in 2004 (Table 35). According to the permit data, about 300 vessels with full-time, 30 with part-time and 7 with occasional permits participated in the sea scallop fishery during 2004. Despite the effort controls and reduction in DAS allocations, total DAS used in the fishery also increased during the same period due to the increase in the number of participants in the fishery (Table 36). During the recent year, the Confirmation of Permit Histories (essentially limited access permits in reserve) was placed on new or newly outfitted vessels. Another important trend was that vessels with part-time and occasional permits were converted into full-time or part-time small dredge permits as the resource conditions improved and the daily catches for a vessel with a small dredge permit became closer to the daily catches of a vessel with a large dredge permit. The number of qualifiers for the scallop limited access fishery has declined, however, from around 450 in 1994 to approximately 380 for the 2003 scallop fishing year (P. Christopher, NMFS, pers.comm.).

Table 35. Scallop Permits by application year.

Permit Category	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005*
Full-time	227	227	214	203	202	207	219	223	229	236	239	
Full-time small dredge	5	4	5	3	2	1	3	13	25	37	47	
Full-time trawl	30	32	27	23	23	16	17	16	16	16	14	
Total full-time	262	263	246	229	227	224	239	252	270	289	300	305
Part-time	26	21	18	16	11	11	15	14	13	10	4	
Part-time small dredge	8	6	8	8	6	3	4	6	8	17	23	
Part-time trawl	30	28	27	30	26	18	20	18	10	7	3	
Total part-time	64	55	53	54	43	32	39	38	31	34	30	27
Occasional	4	3	2	2	3	4	4	5	4	2	2	
Occasional trawl	28	26	25	20	19	20	16	15	15	8	5	
Total occasional	32	29	27	22	22	24	20	20	19	10	7	3
Total limited access	**358**	**347**	**326**	**305**	**292**	**280**	**298**	**310**	**320**	**333**	**337**	**326**
General Category	**1,960**	**2,067**	**1,984**	**1,993**	**1,930**	**2,074**	**2,247**	**2,293**	**2,493**	**2,554**	**2,801**	

* Preliminary numbers by the end of June 2005

Table 36. DAS allocations and fishing effort

Fishing year	DAS Allocated				DAS-used	Number of Permits using DAS
	Full-time	Part-time	Occasional	Total		
1994	204	82	17	59,214	35,378	229
1995	182	73	15	52,310	33,869	238
1996	182	73	15	49,040	34,899	246
1997	164	66	14	41,399	30,832	227
1998	142	57	12	34,937	27,053	232
1999	142	57	12	33,910	23,087	244
2000	120	48	10	30,752	24,465	263
2001	120	48	10	32,264	28,193	282
2002	120	48	10	34,078	30,061	292
2003	120	48	10	36,412	31,597	308
2004	126	50	11	39,386	29,303	325
2005	100	40	8	31,605		

Although the scallop fishery is a limited access fishery, alternative measures are in place to allow vessels that did not qualify for a limited access permit to possess and land scallops as well. These are: (1) through possession of a general category permit or (2) in accordance with the exemption for vessels that have neither a limited access nor general category permit. Scallop possession and landing limits vary depending on which of these apply to the vessel. For example, vessels that have neither a limited access nor general category permit (except those that participate exclusively in the state waters) are allowed to possess and land up to 40 pounds of scallop meat or 5 bushels of shell stock per trip. Vessels that possess a general category permit for the fishery are allowed to retain or land up to 400 pounds of shucked scallops, or 50 U.S. bushels of in-shell scallops per trip. The possession limit is the primary effort control mechanism for the general category vessels. General category permit holders may fish with all gear types, including gillnet, pot/trap, and clam/quahog dredges. However, scallop dredge gear and bottom trawl gear are the most common (NEFMC 2003).

The number of vessels with general category permits has been rising since the late 1990's, increasing from 1,930 in 1998 to 2,801 in 2004 (Table 35). There has been also an increase in general category landings during the recent years from 1.8 million lb. in 2003 to 3.6 million lb. in 2004, most of which was due to the landings by vessels with general category permits (Table 45). This has been the result of increase in scallop abundance combined with an increase in the price of scallops especially during 2005, which made general category scallop fishing quite profitable for some vessels. Extensive information about the characteristics and activity of the general category vessels in 2003 were provided in Framework 17 to the Sea Scallop FMP. Section 4.5.4 reviews the recent trends in the general category scallop fishery with an emphasis on activity in 2004, and Appendix I provides more detailed information.

4.5.2 Trends in landings, revenues and prices in the sea scallop fishery

The scallop fishery is one of the most valuable U.S. fisheries (NMFS 2003a). U.S. landings exceeded 54.6 million pounds in 2003 fishing year and 62.1 million pounds in 2004, a new record. The 2004 U.S. ex-vessel sea scallop revenues were about $307 million making the sea scallop fishery the second most valuable in the northeastern United States (NMFS 2004c). The historical trends in sea scallop landings, revenues, prices are shown in Table 37 for the period 1994-2005. The period from 1994-

1998 corresponds to the implementation of Amendment 4, when the Council began managing the scallop fishery through limited access controls. As Table 1 shows, overfishing in the previous period combined with the effort reduction measures and closure of the Georges Bank groundfish areas to scallop fishing resulted in a dramatic decline in scallop landings, averaging only 15.5 million lb. per year during this period. The period from 1999 to 2004 corresponds, however, to the rebuilding of the sea scallop biomass. As a result of this recovery, landings almost doubled to 21.1 million in 1999 from 11.2 million lb. in 1998, and have increased over 50 million lb. since 2002. During the same period, landings per unit effort, i.e. per day-at-sea used, more than doubled compared to the levels during 1994-1998, lowering the fishing costs per pound of scallops and benefiting the vessels participating in the sea scallop fishery.

Table 37. Total scallop landings and revenues by limited access and by vessels with general category permits.

Fishing year	Total landings (million lbs.)	Total Revenue (million $) (in 2004 prices)	Average price per pound (in 2004 prices)	Average landings per DAS-used
1994	15.3	74.3	$ 4.85	428
1995	15.8	80.2	$ 5.08	463
1996	16.4	92.8	$ 5.65	465
1997	12.8	82.8	$ 6.49	402
1998	11.2	67.7	$ 6.05	406
1999	21.1	115.1	$ 5.47	904
2000	33.2	163.2	$ 4.92	1,329
2001	45.5	166.2	$ 3.65	1,557
2002	49.9	193.5	$ 3.88	1,623
2003	54.6	225.0	$ 4.12	1,668
2004	62.1	307.0	$ 4.94	2,013
2005*	43.2	313.0	$ 7.25	

*All figures for 2005 are preliminary. Landings and revenues for 2005 include 9 months from March to October 2005. For other items, 2005 data includes end of June.

The increase in landings and strong competition from scallop imports led to in a decline in scallop ex-vessel prices during 1999-2002, from $5.47 per lb. in 1994 to $3.65 per lb. in 2001 (in inflation adjusted 2004 prices). Even at these lower prices, annual scallop revenue per year after 1998 significantly exceeded the average revenue during 1994-1998 due to the increase in landings. Both landings and the ex-vessel price of scallops increased after 2001, however, resulting in a record increase in scallop revenues, to over $200 million in 2003 and over $300 million since 2004. Since the start of fishing year 2005, scallop prices continued to increase, rising to over $9.00 per pound since the summer of 2005, and averaging $7.25 per pound for the first 8 months of the fishing year from March to the end of October 2005. This increase was driven by the changes in world demand and supply of scallops, increase in US exports, decrease in the imports from major competitors of US such as Canada and Japan. Another factor was the change in the composition of landings towards larger scallops that command a higher price. For a more comprehensive description and analysis of the economic trends in sea scallop fishery including foreign trade, see Appendix I.

4.5.3 Limited access scallop fishery

The number of limited access vessels and trends in landings and revenue per vessel and vessel characteristics are summarized in Table 38 by broad permit categories and in Table 40 for full-time vessels disaggregated by gear category. Higher overall revenues for the scallop fishery translated into

larger scallop revenue per vessel despite the increase in the number of participants throughout the years. Annual scallop revenue averaged $476,666 per full-time dredge vessel during 1994-1998, but increased by 73 % to $823,417 per vessel during 1999-2004. Revenue per full-time dredge vessel reached an all-time high of $1,080,000 in 2004 (Figure 4).18

Table 38. Trends in landings, Revenue and vessel size by limited access vessels.

Period	Permit Category	Average of Scallop Revenue (1)	Scallop Landings per Vessel	Gross Tonnage	Number of vessels	Horsepower
1982-1988	Full-time	795,662	98,667	160	NA	801
	Part-time	54,276	7,166	117	NA	495
	Occasional	25,890	3,777	104	NA	456
1982-1988 Total		758,860	94,126	157	NA	785
1989-1993	Full-time	706,716	115,212	158	NA	827
	Part-time	82,470	14,268	114	NA	451
	Occasional	14,144	2,434	82	NA	393
1989-1993 Total		664,995	108,457	155	NA	801
1994-1998	Full-time	446,668	66,019	158	245	820
	Part-time	105,596	16,377	130	54	501
	Occasional	3,857	517	73	26	378
1994-1998 Total		424,670	62,798	155	321	325
1999-2004	Full-time	759,816	165,152	152	262	789
	Part-time	208,002	48,136	118	34	485
	Occasional	7,193	1,680	90	17	420
1999-2004 Total		720,205	156,707	150	315	313

(1) Adjusted for inflation and expressed in terms of 2004 prices

18 Although these figures are consistent with the overall trends, they should be interpreted with caution because they are obtained from dealer's data, which may not be totally consistent throughout the years 1982 to 2004. A new data collection system was implemented in 1994 and then again in 2004. In addition, there were no limited access permit categories prior to 1994, and the data for 1982 to 1993 was derived by tracing the activity of the vessels that had a limited access permit in 2004 to the previous years. In addition, not all vessels that had a permit in 2004 were active or caught scallops in the earlier years.

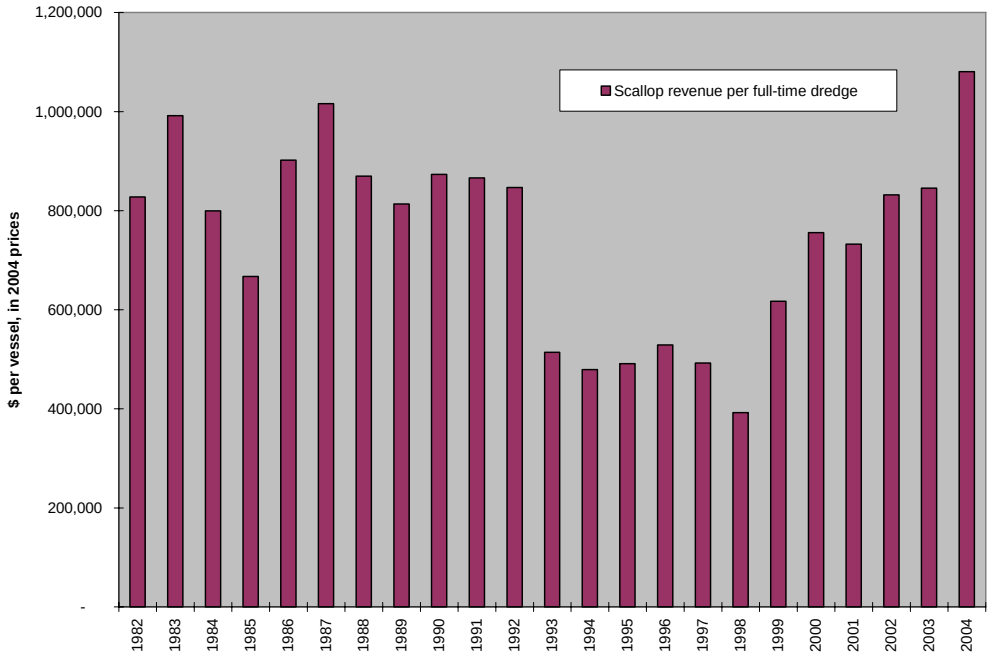


Figure 4. Scallop revenue per full-time dredge vessel (in 2004 inflation adjusted prices)

Overwhelmingly, dredge gear is the primary gear type used in the scallop fishery (Table 39). Ninety-five percent of the scallop landings for the 2003 scallop fishing year were attributed to scallop dredge gear. It is interesting to note, however, that while landings by trawl gear (~ 5% of the total) were much lower than landings by dredge gear, the Delmarva resource area accounted for 90% of the trawl landings (NMFS Preliminary Fisheries Statistics). Less than 2% of trawl landings were attributed to non-Mid-Atlantic resource areas (NMFS Preliminary Fisheries Statistics).

Table 39. Landings by limited access vessels by gear type

Fishing year	Gear Type			
	Total	Dredge	Trawl	Other
1994	15.1	90.5%	9.2%	0.3%
1995	15.7	90.2%	9.5%	0.3%
1996	16.2	91.0%	8.7%	0.3%
1997	12.4	92.9%	6.3%	0.8%
1998	11.0	88.0%	11.2%	0.7%
1999	20.9	90.2%	9.5%	0.4%
2000	32.5	91.3%	7.6%	1.1%
2001	43.9	91.0%	6.9%	2.1%
2002	48.8	93.4%	5.4%	1.2%
2003	52.7	95.4%	4.0%	0.6%
2004	59.0	93.8%	5.9%	0.3%
2005*	37.9	99.1%	0.8%	0.1%

*All figures for 2005 are preliminary. Landings and revenues for 2005 include 9 months from March to October 2005. For other items, 2005 data includes end of June.

Table 40. Trends in landings, Revenue and vessel size by full-time vessels.

Period	Permit Category	Average of Scallop Revenue (1)	Scallop Landings per Vessel	Gross Tonnage	Horse-power	Number of Vessels
1982-1988	Full-time	870,756	107,901	164	828	NA
	Full-time small dredge	175,229	22,469	117	584	NA
	Full-time trawl	35,462	4,835	128	494	NA
1982-1988 Total		795,662	98,667	160	NA	801
1989-1993	Full-time	782,779	126,929	165	877	NA
	Full-time small dredge	166,570	29,764	114	527	NA
	Full-time trawl	333,693	62,394	122	461	NA
1989-1993 Total		706,716	115,212	158	NA	827
1994-1998	Full-time	476,666	69,572	165	872	215
	Full-time small dredge	129,688	20,792	108	472	4
	Full-time trawl	387,205	68,337	121	475	27
1994-1998 Total		446,668	66,019	158	246	820
1999-2004	Full-time	823,417	177,506	162	853	226
	Full-time small dredge	379,628	86,471	108	510	21
	Full-time trawl	683,092	161,590	118	470	16
1999-2004 Total		759,816	165,152	152	263	789

(1) Adjusted for inflation and expressed in 2004 prices.

The trends in revenue for part-time and occasional vessels are similar to the trends for full-time vessels although they are less certain due to the recent switches in permit category of these vessels to full-time or part-time small dredge categories as mentioned above.

Table 38 shows that the average annual revenue of a full-time vessel, including trawls and small-dredge vessels, increased by 70% during the 1999-2004 period compared to the average revenue per vessel during the 1994-1998 period. Scallop revenue per part-time and occasional vessel almost doubled during the same periods.

The striking increase in the scallop revenue per full-time vessel according to the gear categories is evident from Table 40. While the vessels in all categories have more than doubled their annual scallop revenue during 1999-2004, annual scallop revenue per full-time small dredge vessel almost tripled, explaining the incentive to transfer part-time permits to full-time small-dredge permit during recent years.

Table 41. Revenue per vessel for full-time vessels by tonnage class.

Period	Permit Category	51-100 GRT	101-150 GRT	> 150 GRT
1982-1988	Full-time	486,878	718,082	945,195
	Full-time small dredge	20,320	238,461	217,925
	Full-time trawl	10,824	36,830	
1982-1988 Total		148,698	607,591	936,121
1989-1993	Full-time	505,528	670,336	835,730
	Full-time small dredge	49,133	224,116	191,689
	Full-time trawl	356,245	289,338	609,979
1989-1993 Total		198,689	563,483	828,903
1994-1998	Full-time	338,541	426,467	500,875
	Full-time small dredge	80,408	169,379	1,283
	Full-time trawl	285,492	410,290	455,876
1994-1998 Total		181,255	394,017	499,601
1999-2004	Full-time	711,558	765,623	856,910
	Full-time small dredge	297,508	406,327	583,676
	Full-time trawl	678,464	689,639	638,055
1999-2004 Total		470,578	690,545	851,443

(1) All revenue numbers are adjusted for inflation and expressed in 2004 prices.

There does not seem to be a significant change in vessel size in terms of gross tonnage or horsepower during these periods. The average revenue per vessel is higher, however, for larger vessels compared to vessels with smaller gross tonnage (Table 41).

Table 42 shows revenue per full-time vessel by region determined according to the homeport of the vessel. The average revenue per vessel home ported in New England tends to be higher than the Mid-Atlantic vessels probably because New England vessels are larger on the average than the vessels in Mid-Atlantic (Table 43). Full-time vessels derive almost all their revenue from scallops (at least 90% or over), while for part-time vessels average revenue earned from scallops constitute 43% to 73% of their annual revenue depending on the gear type and location of the vessels (Table 44).

Table 42. Scallop revenue per full-time vessel by region (determined by home state).

Period	Permit category	Mid-Atlantic	New England	Grand Total
1982-1988	Full-time	657,510	1,086,112	870,756
	Full-time small dredge	181,836	164,261	177,561
	Full-time trawl	35,462		35,462
1982-1988 Total		577,890	1,046,792	796,538
1989-1993	Full-time	608,367	939,520	782,779
	Full-time small dredge	144,057	400,139	166,570
	Full-time trawl	333,693		333,693
1989-1993 Total		513,744	930,180	706,716
1994-1998	Full-time	418,864	530,241	476,666
	Full-time small dredge	108,677	390,226	129,688
	Full-time trawl	387,205		387,205
1994-1998 Total		377,741	528,610	446,668
1999-2004	Full-time	776,998	868,762	823,848
	Full-time small dredge	346,294	522,850	378,764
	Full-time trawl	683,092		683,092
1999-2004 Total		691,392	851,385	762,315

Table 43. Average gross tonnage of full-time vessels by region.

Period	Permit category	Mid-Atlantic	New England	Grand Total
1982-1988	Full-time	152	176	164
	Full-time small dredge	122	109	119
	Full-time trawl	128		128
1982-1988 Total		148	173	160
1989-1993	Full-time	152	176	165
	Full-time small dredge	114	115	114
	Full-time trawl	122		122
1989-1993 Total		144	175	158
1994-1998	Full-time	152	177	165
	Full-time small dredge	107	121	108
	Full-time trawl	121		121
1994-1998 Total		143	176	158
1999-2004	Full-time	150	173	162
	Full-time small dredge	113	109	112
	Full-time trawl	118		118
1999-2004 Total		141	170	153
Grand Total		143	173	157

Table 44. Percentage of Revenue from Scallops (2004).

Permit Category	Mid-Atlantic	New England	Grand Total
Full-time	97%	97%	97%
Full-time small dredge	93%	99%	95%
Full-time trawl	95%		95%
Part-time	73%	43%	58%
Part-time small dredge	68%	55%	66%
Part-time trawl	58%		58%
Occasional trawl	9%		9%
Grand Total	91%	96%	93%

4.5.4 General Category Fleet

There has been a significant increase in the number of vessels with general category permits participating in the scallop fishery during the recent years (Table 35). This has been the result of increase in scallop abundance combined with an increase in the price of scallops especially during 2005, which made general category scallop fishing quite profitable for some vessels. General category scallop landings increased from 1.8 million lb. in 2003 to 5.6 million lb. in 2005. As a result, the share of scallop landings by general category vessel increased from 3.04% in 2003 to 12.30% in 2005 (first 8 months of the fishing year) of total scallop landings (Table 45). Landings by the limited access vessels constituted only a small proportion of the general category landings.

Table 45. General category landings by permit and gear type

Year	Total general category landings**	Percent of total landings	By general category permits	By limited access permits	Dredge	Scallop trawl	Finfish trawl	Other
1994	0.2	1.3%	1.14%	0.16%	70.3%	26.7%	2.7%	0.3%
1995	0.4	2.3%	2.10%	0.20%	89.3%	3.3%	5.2%	2.2%
1996	0.6	3.5%	3.21%	0.29%	87.2%	0.2%	2.8%	9.7%
1997	0.5	4.0%	3.40%	0.60%	94.3%	0.1%	4.1%	1.4%
1998	0.4	3.9%	2.53%	1.37%	85.2%	4.6%	8.5%	1.7%
1999	0.4	2.0%	1.03%	0.97%	59.1%	19.8%	11.3%	9.8%
2000	1.5	4.5%	3.80%	0.70%	39.6%	4.4%	54.2%	1.9%
2001	2.2	4.8%	4.33%	0.47%	75.1%	7.6%	12.6%	4.8%
2002	1.3	2.7%	2.35%	0.35%	87.5%	4.6%	5.5%	2.4%
2003	1.8	3.3%	3.04%	0.26%	76.1%	11.4%	10.0%	2.4%
2004	3.6	5.8%	5.35%	0.45%	68.7%	12.1%	15.7%	3.5%
2005*	5.6	13.0%	12.30%	0.70%	NA	NA	NA	NA

*All figures for 2005 are preliminary. Landings and revenues for 2005 include 9 months from March to October 2005.
For other items, 2005 data includes end of June.
** Includes general category landings by limited access vessels as well.

The increase in the participation in the general category fishery in 2004 is also evident from Table 47. The number of active general category vessels increased from 352 in 2003 to 476 in 2004, and the total general category landings increased from approximately 1.6 million lb. to 3.0 million lbs. during the same years. The landings by 233 new entrants comprised 39% of total general category landings in 2004, while the landings by vessels that were active both in 2003 and 2004 totaled 1.7 million lb. (Table 46).

Table 46. General category vessel characteristics and activity in 2003 and 2004.

Year	Data	Active in 2003	New activity in 2004	Grand Total
2003	Number of vessels	352		352
	Gross Tonnage	53		53
	Length	53		53
	Crew size	3		3
	Scallop lb. per trip	183		183
	Total number of trips	6,010		6,010
	Total scallop landings	1,663,113		1,663,113
	% of total scallop landings	100%	0%	100.00%
2004	Number of vessels	243	233	476
	Gross Tonnage	59	70	64
	Length	55	58	56
	Crew size	3	4	3
	Scallop lb. per trip	292	418	354
	Total number of trips	5,647	3,271	8,918
	Total scallop landings	1,795,119	1,161,382	2,956,501
	% of total scallop landings	61%	39%	100%

Table 47 shows that participation by vessels home-ported both in New England and Mid-Atlantic regions increased in 2004, by almost at the same rate. In terms of area-fished, however, most of the new activity by the general category vessels occurred in Mid-Atlantic, with new entrants in this area landing 22% of general category scallops in 2004. Table 48 shows composition of landings by major gear types and by specific area fished in the same year. As expected major proportion of scallops are landed by scallop dredges in each area. The shift in geographic activity by the general category fleet to Mid-Atlantic could also be clearly seen from Table 53. The share of Mid-Atlantic in total general category scallop landings increased from 47% in 2003 to almost 62% in 2004. The vessel trip report (VTR) for the first five months of 2005 shows that this trend continues with an increase in the share of Mid-Atlantic to 73%.

Table 47. General category activity by region of homeport in 2004.

Year	Data	Active in 2003	New Activity in 2004	Grand Total
Mid Atlantic	Number of vessels	103	83	186
	Gross Tonnage	69	64	67
	Length	59	58	59
	Crew size	3	3	3
	Total number of trips	3,083	1,717	4,800
	Total scallop landings	1,098,329	604,678	1,703,007
	% of total scallop landings	64.49%	35.51%	100.00%
New England	Number of vessels	140	150	290
	Gross Tonnage	51	73	62
	Length	51	58	55
	Crew size	3	4	3
	Total number of trips	2,564	1,554	4,118
	Total scallop landings	696,790	556,704	1,253,494
	% of total scallop landings	55.59%	44.41%	100.00%

Table 48. General category landings by gear and area-fished, and according to new activity (as a % of total general category landings in 2004).

Area fished	Gear	Active in 2003	New Activity in 2004	Grand Total
Georges Bank	DREDGE,SCALLOP,SEA	10.06%	8.29%	18.36%
	OTTER TRAWL,BOTTOM,FISH	1.53%	2.21%	3.74%
Georges Bank Total		11.59%	10.50%	22.09%
Gulf of Maine	DREDGE,SCALLOP,SEA	5.61%	1.39%	7.00%
	OTTER TRAWL,BOTTOM,FISH	0.64%	0.03%	0.67%
	OTTER TRAWL,BOTTOM,SHRIMP	0.01%	0.00%	0.01%
Gulf of Maine Total		6.25%	1.42%	7.67%
Mid-Atlantic	DREDGE,SCALLOP,SEA	24.06%	14.54%	38.60%
	OTTER TRAWL,BOTTOM,FISH	6.78%	3.82%	10.60%
	OTTER TRAWL,BOTTOM,SCALLOP	8.14%	3.84%	11.98%
	OTTER TRAWL,BOTTOM,SHRIMP	0.05%	0.00%	0.05%
Mid-Atlantic Total		39.03%	22.20%	61.23%
Southern New England	DREDGE,SCALLOP,SEA	2.69%	2.91%	5.60%

	OTTER TRAWL,BOTTOM,FISH	0.02%	0.77%	0.80%
Southern New England Total		2.71%	3.68%	6.40%
Unspecified	DREDGE,SCALLOP,SEA	1.34%	0.16%	1.49%
	OTTER TRAWL,BOTTOM,FISH	0.11%	0.78%	0.89%
	OTTER TRAWL,BOTTOM,SCALLOP	0.22%	0.00%	0.22%
	OTTER TRAWL,BOTTOM,SHRIMP	0.01%	0.00%	0.01%
Unspecified Total		1.68%	0.93%	2.61%

Table 49. General category landings by gear and fishing area by year and gear type (as a % of total general category landings).

Area Fished	GEAR	2003	2004	2005
Georges Bank	DREDGE,OCEAN QUAHOG/SURF CLAM	0.02%	0.01%	0.00%
	DREDGE,OTHER	0.00%	0.00%	0.03%
	DREDGE,SCALLOP,SEA	20.43%	18.14%	1.68%
	OTTER TRAWL,BOTTOM,FISH	0.73%	3.69%	2.56%
	OTTER TRAWL,BOTTOM,SCALLOP	0.02%	0.00%	0.00%
Georges Bank Total		21.21%	21.84%	4.28%
Gulf of Maine	DREDGE, URCHIN	0.00%	0.00%	0.00%
	DREDGE,OCEAN QUAHOG/SURF CLAM	0.13%	0.00%	0.00%
	DREDGE,SCALLOP,SEA	26.29%	6.92%	16.36%
	OTTER TRAWL,BOTTOM,FISH	0.54%	0.66%	0.01%
	OTTER TRAWL,BOTTOM,SCALLOP	0.08%	0.00%	0.74%
	OTTER TRAWL,BOTTOM,SHRIMP	0.01%	0.01%	0.00%
Gulf of Maine Total		27.05%	7.58%	17.12%
Mid-Atlantic	DREDGE,OCEAN QUAHOG/SURF CLAM	1.23%	1.16%	6.09%
	DREDGE,SCALLOP,SEA	25.90%	38.15%	60.91%
	OTTER TRAWL,BOTTOM,FISH	7.56%	10.47%	3.78%
	OTTER TRAWL,BOTTOM,SCALLOP	11.77%	11.84%	1.07%
	OTTER TRAWL,BOTTOM,SHRIMP	0.93%	0.05%	0.76%
Mid-Atlantic Total		47.39%	61.67%	72.61%
Southern New England	DREDGE,SCALLOP,SEA	0.12%	5.53%	4.48%
	OTTER TRAWL,BOTTOM,FISH	0.09%	0.79%	0.02%
Southern New England Total		0.22%	6.32%	4.50%
Unspecified	DREDGE,OCEAN QUAHOG/SURF CLAM	0.00%	0.01%	0.21%
	DREDGE,SCALLOP,SEA	3.59%	1.48%	1.28%
	OTTER TRAWL,BOTTOM,FISH	0.54%	0.87%	0.02%
	OTTER TRAWL,BOTTOM,SCALLOP	0.00%	0.22%	0.00%
	OTTER TRAWL,BOTTOM,SHRIMP	0.00%	0.01%	0.00%
Unspecified Total		4.13%	2.59%	1.50%
Grand Total		100.00%	100.00%	100.00%

Another trend in the general category fishery was the increase in the number of vessels that landed 300 lb. or more from any one given trip. According to the VTR data, in 2003 calendar year, only 158 vessels, that is less half of the general category fleet had a trip landing equal or in excess of 300 lb. In 2004, however, this number increased to 294 vessels comprising over 62% of the general category

vessels. As Table 50 shows, over 96% of the scallops in 2003 and over 98% in 2004 were landed by these vessels. There seems to be an equal number of vessels in 2004 that landed 300 lb. or over in any one trip whether or not they participated in the general category fishery in 2003 or only in 2004 (Table 51). Majority of general category vessels took 10 trips or less both in 2003, 203 out of 332 vessels, and in 2004, 289 out of 476 vessels (Table 52). Over 40% of the scallops were landed in each year, however, by a few vessels that took 70 trips or more per year.

Table 50. Landings and number of general category vessels by maximum scallop pounds per trip.

Maximum lb. from a trip	Data	2003	2004
40 lb. or less	Number of vessels	83	73
	% of total scallop landings	0.4%	0.1%
41 to 299lb.	Number of vessels	111	108
	% of total scallop landings	3.7%	1.7%
>=300 lb.	Number of vessels	158	294
	% of total scallop landings	96%	98%
Total Number of vessels		352	475
Total % of total scallop landings		100%	100%

Table 51. Landings and number of general category vessels by maximum scallop pounds per trip and activity (2004).

Maximum lb. from a trip	Data	Active in 2003	New activity in 2004	Grand Total
40 lb.or less	Number of vessels	40	33	73
	% of total scallop landings	0.2%	0.1%	0.1%
41 to 299lb.	Number of vessels	54	54	108
	% of total scallop landings	1.8%	1.6%	1.7%
>=300 lb.	Number of vessels	148	146	294
	% of total scallop landings	98%	98%	98%
Total Number of vessels		242	233	475
Total % of total scallop landings		100%	100%	100%

Table 52. General category vessels by the number of scallop trips in a year.

Number of trips	Data	2003	2004
10 trips or less	Number of vessels	203	289
	% of total scallop landings	6%	11%
	Number of trips per vessel	3	3
	Average scallop Lb. per trip	136	398
10-29 trips	Number of vessels	80	89
	% of total scallop landings	14%	13%
	Number of trips per vessel	16	18
	Average scallop Lb. per trip	185	236
30-49 trips	Number of vessels	30	41
	% of total scallop landings	20%	17%
	Number of trips per vessel	37	39
	Average scallop Lb. per trip	299	288
50-69 trips	Number of vessels	15	25
	% of total scallop landings	15%	17%
	Number of trips per vessel	57	58
	Average scallop Lb. per trip	288	349
>= 70 trips	Number of vessels	24	32
	% of total scallop landings	45%	42%
	Number of trips per vessel	87	102
	Average scallop Lb. per trip	357	369
Total Number of vessels		352	476
Total % of total scallop landings		100%	100%
Total Number of trips per vessel		17	19
Total Average scallop Lb. per trip		183	354

About 47% of the scallops in 2003 and 46% of scallops in 2004 were landed by a small group of vessels that derived 90% or more of their annual revenue from scallop fishing (Table 53). On the other hand, there were 96 vessels in 2003, and 149 vessels in 2004 that derived less than 5% of their annual revenue from scallops. Scallop revenue of all group of vessels shown in Table 53 increased in 2004 compared to 2003, however. The revenue data in Table 53 was estimated from the dealer's data since no data item exists in VTR.

Table 53. General category vessel by percentage of annual revenue from scallops (2004)

Year	Data	<5%	5%-19%	20%-39%	40%-59%	60%-79%	80%-89%	>=90%	UNKNOWN	Grand Total
2003	Number of vessels	96	25	19	15	6	7	67	117	352
	Gross Tonnage	89	48	33	42	22	33	37	43	53
	Length	64	55	47	50	46	46	48	48	53
	Crew size	4	3	3	3	3	2	3	3	3
	Scallop lb. per trip	131	222	368	321	371	187	288	99	183
	Annual scallop revenue	2,777	22,954	40,528	77,326	98,579	50,168	54,561		22,206
	Annual Total revenue	314,879	184,152	123,467	158,479	141,873	55,209	60,591		190,862
	Scallop revenue as a % of total revenue	1%	11%	27%	51%	68%	85%	99%		39%
	Total number of trips	458	431	450	678	334	339	2,395	925	6,010
	Total scallop landings	56,712	122,097	163,837	246,784	125,845	74,718	777,781	95,339	1,663,113
	% of total scallop landings	3%	7%	10%	15%	8%	4%	47%	6%	100%
2004	Number of vessels	149	32	15	21	14	16	96	133	476
	Gross Tonnage	96	55	66	47	32	59	48	48	64
	Length	66	54	59	52	45	56	53	50	56
	Crew size	4	3	3	3	3	3	3	3	3
	Scallop lb. per trip	413	270	279	376	374	329	299	353	354
	Annual scallop revenue	6,941	27,290	47,997	85,348	97,023	74,611	71,813		31,376
	Annual Total revenue	338,373	199,174	174,111	146,913	109,016	84,658	74,451		211,417
	Scallop revenue as a % of total revenue	1%	12%	29%	49%	72%	86%	99%		41%
	Total number of trips	830	532	411	902	678	663	3,968	934	8,918
	Total scallop landings	203,908	172,928	142,564	354,914	268,976	236,390	1,365,151	211,670	2,956,501
	% of total scallop landings	7%	6%	5%	12%	9%	8%	46%	7%	100%

4.5.5 Fishing Practices and Use of Space

In general, sea scallops are found in the Northwest Atlantic Ocean from North Carolina to Newfoundland along the continental shelf, typically on sand and gravel bottoms (Packer et al. 1999). In terms of the U.S. Atlantic scallop fishery, it is generally described as occurring in three areas: the Gulf of Maine, Georges Bank, and the Mid-Atlantic. The bulk of the Gulf of Maine landings are from relatively shallow waters (<40m) near-shore (NMFS 2004c). Gulf of Maine landings account for a very small portion of the overall annual scallop landings. In 2003, Gulf of Maine scallop landings were only 254 mt — less than 1% of the total 2003 landings (NMFS 2004c). Landings from Georges Bank have averaged almost 5000 mt annually during 1999-2003 (NMFS 2004c). However, it has been the Mid-Atlantic that has seen the largest growth in scallop landings. These areas have been experiencing an upward trend in both recruitment and landings since the mid-1980s (NMFS 2004c). Landings during each of the last 4 years (2000-2003) set new records for the Mid-Atlantic region with landings of over 19,000 mt in 2003 (NMFS 2004c).

The scallop fishery over Georges Bank and in the Mid-Atlantic is a deeper water fishery in comparison to the Gulf of Maine. Concentrations of scallops occur within a narrow depth band in the Mid-Atlantic from about the 40 meter isobath to the 200 meter isobath, throughout the Hudson Canyon Access Area, around the perimeter of Georges Bank, including the Great South Channel (NEFMC 2001). Therefore, it is not surprising that most scallops are harvested at depths between 30 and 100 meters in the Georges Bank and the Mid-Atlantic areas (NMFS 2004c). Each of these areas is also more productive in terms of scallop landings as compared to the Gulf of Maine.

The location of scallop fishing effort is often characterized based on area fished. Eight scallop resource areas have been identified. These are:

- Gulf of Maine (statistical areas 511-515);
- South Channel (statistical areas 521, 522, and 526);
- Georges Bank North (statistical areas 561 and 562)
- Georges Bank South (statistical area 525);
- Southern New England (statistical areas 537-539);
- New York Bight (statistical areas 611-616);
- Delmarva (statistical areas 621-623, 625-627); and,
- Virginia/North Carolina (statistical areas 631-638) (NEFMC 2000a) (Appendix A).

Among the eight areas, three were major production areas for the 2003 scallop fishing year (March 1, 2003 - February 29, 2004) and accounted for 90% of the total scallop landings (NMFS Preliminary Fisheries Statistics). These three areas and their respective contribution to the scallop landings are: South Channel (11%), New York Bight (35%), and Delmarva (44%) (NMFS Preliminary Fisheries Statistics).

Despite an image of a highly mobile fleet, many fishermen tend to fish in the same areas and in areas close to their home and landing ports. The majority of vessels—both limited access and general category vessels—caught the majority of their annual scallop pounds in just one statistical area (Table 54 and Table 55). Virtually all general category vessels did so, as well as usually at least half of limited access vessels in most years. This can be for any number of reasons: that they fish with small boats and/or are day-trip boats, that they have extensive knowledge of particular but not all areas, and so on. The implication for the different area management alternatives is to reinforce that any areas considered for closure must be especially sensitive of the fishermen and fishing communities that may be exclusively dependent on them.

Table 54. General Category Vessels catching at least half of their annual scallop catch in one statistical area, Fishing years 1995-2004. Source: 1994-2005 logbooks.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
No. of Vessels	142	162	174	148	163	174	236	240	269	400
Percentage of Active Vessels	96.6	98.2	98.3	96.7	98.2	98.3	97.9	98.8	96.8	94.1
Average Percentage of Landings from One Statistical Area	94.1	94.7	94.8	94.0	94.5	93.2	92.8	90.7	92.6	88.0

Table 55. Limited Access Vessels catching at least half of their annual scallop catch in one statistical area, Fishing years 1995-2004. Source: 1994-2005 logbooks.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
No. of Vessels	129	131	115	141	102	108	150	170	179	112
Percentage of Active Vessels	53.5	53.0	50.9	61.3	41.6	41.2	52.6	58.0	58.1	35.2
Average Percentage of Landings from One Statistical Area	74.8	71.3	70.0	72.9	67.1	67.7	68.2	68.6	70.4	66.2

Moreover, not all areas are the same: the spatiality of fishing grounds implies that not only are some areas biologically more productive than others, but that fishermen choose to fish in particular areas for a myriad of other social as well as economic reasons. Day-trippers, for example, may fish close to shore because of a personal and social desire to come back home every night, even if that might mean for some a lower annual income. The areas that line the coast of New England, and to a lesser extent, the Mid-Atlantic, seem to be more important in terms of annual catch dependence, though not necessarily in sheer volume. This is especially true for general category vessels, which tend on average to be smaller, but also for some limited access vessels as well. An expansion of the economic component of this SAFE Report can be found in Appendix I, which provides extensive information on the fishing characteristics by statistical area as well as range of fishing activities as reflected by other fisheries participated and other permits held by both limited access and general category vessels.

The commercial scallop fishery operates year round (Hart 2001). Seasonal peaks in sea scallop landings are evident but must be considered in light of management measures that can influence when vessels fish. For example, part of Closed Area II over Georges Bank was reopened to scallop fishing for a portion of the 1999 scallop fishing year. The seasonality of the opening likely affected landings for those months when the closed area was accessible to scallop fishing. Similarly, in 2001-2003, the Hudson Canyon Access Area in the Mid-Atlantic was accessible to scallop fishers for a portion of each scallop year which may have influenced the trend in monthly landings.

4.5.6 The scallop ports

While the fleet is spread throughout the eastern seaboard, the majority of limited access vessels are found in Massachusetts, Virginia, New Jersey, and North Carolina (SAFE 2005, Tables 17 and 19). For general category permits, the majority operates out of Massachusetts, Maine and New Jersey (SAFE 2005, Tables 18 and 20). Most limited access vessels are large throughout, with the exception of Maine; the general category vessels are fairly small throughout, though individual vessels do vary. For the limited

access fleet, the homeports New Bedford, Cape May, Newport News and Norfolk have the highest number of permitted vessels (SAFE 2005, Table 21). For the general category fleet, the homeports New Bedford, Gloucester, Cape May, Point Judith, and Chatham have the highest number of permitted vessels (SAFE 2005, Table 22). These vessels may be owned by individual owner-operators, or by fishing companies which own multiple vessels. In 1996, it was estimated that 69 percent of fishing companies owned only one permit, while 9 companies owned between 6 and 10 permits, or over one-fourth of total permits (Edwards 2001). While ongoing work is seeking to update these numbers, informal interviews with fishermen have indicated increasing consolidation in recent years (Olson, in review).

Vessels land their catch at different ports at different times of the year, or at ports other than their homeports. The relation between these different geographies has significance for understanding the communities to which fishermen belong, the mutual influences between communities—as places for socialization and social organization—and the impacts of management. The top ten landing ports have stayed relatively consistent in recent years, with New Bedford dominating. For most of these ports, scallops account for the majority of the ports' landed value. There have been some changes, however, with Hampton VA seeing an increasingly smaller share of total landings, and other port areas—namely Cape Cod ports—seeing an increasing importance from scallops. Many of the top homeports are the same as the landing ports, with exceptions such as Fairhaven (where many vessels offload in New Bedford), and North Carolina vessels. Over half of the ports in table 12 had a significant portion (at least 10%) of landed value of scallops from landings by general category vessels. These ports are (with percentage of scallops landed in that port by general category vessels in 2003 in parentheses): Hampton Bays (100), Wellfleet (99), Chatham (98), Rockport (95), Harwich Port (90), Provincetown (90), Sandwich (84), Gloucester (83), Newburyport (77), Ocean City (62), Chincoteague (47), Other Barnstable (29), Barnegat Light (17), Wildwood (13), Point Judith (11), Point Pleasant (10). Over one-third of top homeports also had a significant portion (at least 10%) of landed value of scallops from landings by general category vessels. These ports are (with percentage of scallops landed in that port by general category vessels in 2003 in parentheses, unless otherwise noted): Wellfleet (100), Provincetown (100), Sandwich (100), Chatham (100), Brunswick (100), Toms River (100), Lubec (100), Bucks Harbor (100), Chincoteague (100), Tiverton (100), Morehead City (100), Newburyport (99), Engelhard (40), Gloucester (39), Owls Head (38), Belhaven (28), Wildwood (27), Barnegat Light (17), Spruce Head (13), and Barnstable (12 percent in 2004). See Appendix I, Tables 23 to 24 for detailed information on the fishing activity by port.